

REIMBURSABLE SPACE ACT AGREEMENT
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER WHITE SANDS TEST FACILITY
AND THE BOEING COMPANY
FOR STP3 R40B HOT FIRE TESTING.

ARTICLE 1. AUTHORITY AND PARTIES

In accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113(e)), this Agreement is entered into by the National Aeronautics and Space Administration NASA Lyndon B. Johnson Space Center White Sands Test Facility, located at 12600 NASA Road, Las Cruces, NM 88012 (hereinafter referred to as "NASA JSC," "JSC," "NASA WSTF," "WSTF," or "NASA") and THE BOEING COMPANY located at 2060 E. Imperial Highway, El Segundo, CA 90245-3507 (hereinafter referred to as "Partner" or "BOEING"). NASA and Partner may be individually referred to as a "Party" and collectively referred to as the "Parties."

ARTICLE 2. PURPOSE

The purpose of this agreement is to enable NASA White Sands Test Facility (WSTF) to perform hot fire testing of former Shuttle R40b thrusters and provide the test results to Boeing so that they can assess and use the R40b thrusters in space-based applications associated with the Department of Defense (DoD) Space Technology Program (STP3).

Hot fire testing will be performed by the NASA WSTF Propulsion Test Office using hypergol. This type of testing has become a niche capability that is limited in testing facilities. WSTF is one of the few governmental testing facilities available to support rocket launch and test facility operations available to test hypergol at altitude. This is largely due to the high cost of maintaining the testing infrastructure. The testing will afford NASA the opportunity to maintain critical skills.

ARTICLE 3. RESPONSIBILITIES

NASA will use reasonable efforts to:

1. Develop a WSTF test directive to direct this test series.
2. Provide propellant tanks, helium saturation, and feed systems for Dinitrogen Tetroxide (N₂O₄) and Monomethyl Hydrazine (MMH) to the thruster hardware.
3. Provide facility instrumentation for all feed system and propellant handling systems.
4. Provide remotely operated high speed still photography, high speed video (400 frames per second minimum), high definition video, and infra-red video.
5. Provide data acquisition system with thrust measurement system.
6. Provide steady-state and transient flow measurement system.
7. Provide test preparation documentation, including Test Directives and conduct Test Readiness Review (TRR).

8. Provide fabrication/modification of test systems (propellant, feed, thrust, and flow) per test requirements
9. Perform a minimum of 4 hot fire tests.
10. Provide a data package documenting the results of all test operations.
11. Procure necessary quantities of propellants (Monomethylhydrazine and MON3 Dinitrogen Tetroxide).

BOEING will use reasonable efforts to:

1. Provide input for/ authorization of the R40b test directive.
2. Review and provide approval on all test configuration, test plan, and test procedures.
3. Provide the Shuttle R40b thrusters for testing.
4. Participate in the WSTF TRR.

ARTICLE 4. SCHEDULE AND MILESTONES

The planned major milestones for the activities defined in the "Responsibilities" Article are as follows:

Test Directive Released	2 weeks after receipt of funding
Design Review	Approx. 1 month after receipts of funding
Instrumentation Complete	Approx. 2 months after receipt of funding
Saturation Panel Complete	Approx. 2.5 months after receipt of funding
Photo/Video Complete	Approx. 2 months after receipt of funding
Data acquisition with Thrust measurement systems complete	Approx. 2 months after receipt of funding
Boeing approved procedures released.	Approx. 2.5 months after receipt of funding
Test Readiness Review conducted with Boeing participation	Approx. 3 months after receipt of funding
Procure necessary MMH and NTO	Approx. 1 months after receipt of funding
Complete Combined Systems Validation	Approx. 3.5 months after receipt of funding and 1

	week after Thruster 1 is provided
HF of Thruster 1	Approx. 2 weeks after Completing the Combined Systems Validation
HF of Thruster 2	Approx. 1 week after Completing Thruster 1 Test and 1 week after Thruster 2 is provided
HF of Thruster 3	Approx. 1 week after Completing Thruster 2 Test and 1 week after Thruster 3 is provided
HF of Thruster 4	Approx. 1 week after Completing Thruster 3 Test and 1 week after Thruster 4 is provided
Deliver data packs for all thrusters	Approx. 2 weeks after Completing all thruster tests

ARTICLE 5. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of \$3,071,408 for NASA to carry out its responsibilities under this Agreement. In no event will NASA transfer any U.S. Government funds to Partner under this Agreement. Payment must be made by Partner in advance of initiation of NASA's efforts on behalf of the Partner.

B. Payment shall be payable to the National Aeronautics and Space Administration through the NASA Shared Services Center (NSSC) (choose one form of payment):

(1) U.S. Treasury FEDWIRE Deposit System, Federal Reserve Wire Network Deposit System;

(2) pay.gov at www.nssc.nasa.gov/customerservice (select "Pay NASA" from the Quick Links to right) of the page) or <https://paygov.nssc.nasa.gov/> and select the appropriate NASA Center for the agreement from the drop down; or

(3) check. A check should be payable to NASA and sent to:

NASA Shared Services Center
FMD – Accounts Receivable For the Accounts of: White Sands Test Facility

Building 1111,
Jerry Hlass Rd.,
Stennis Space Center, MS 39529

Payment by electronic transfer (#1 or #2, above), is strongly encouraged, and payment by check is to be used only if circumstances preclude the use of electronic transfer. All payments and other communications regarding this Agreement shall reference the Center name, title, date, and number of this Agreement.

C. NASA will not provide services or incur costs beyond the existing payment. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Agreement will be accomplished for the above estimated amount. Should the effort cost more than the estimate, Partner will be advised by NASA as soon as possible. Partner shall pay all costs incurred and has the option of canceling the remaining effort, or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Agreement be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within one (1) year after completion of all effort under this Agreement, and promptly thereafter return any unspent funds to Partner. Return of unspent funds will be processed via Electronic Funds Transfer (EFT) in accordance with 31 C.F.R. Part 208 and, upon request by NASA, Partner agrees to complete the Automated Clearing House (ACH) Vendor/Miscellaneous Payment Enrollment Form (SF 3881).

D. Notwithstanding any other provision of this Agreement, all activities under or pursuant to this Agreement are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, (31 U.S.C. § 1341).

ARTICLE 6. PRIORITY OF USE

Any schedule or milestone in this Agreement is estimated based upon the Parties' current understanding of the projected availability of NASA goods, services, facilities, or equipment. In the event that NASA's projected availability changes, Partner shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA's use of the goods, services, facilities, or equipment shall have priority over the use planned in this Agreement. Should a conflict arise, NASA in its sole discretion shall determine whether to exercise that priority. Likewise, should a conflict arise as between two or more non-NASA Partners, NASA, in its sole discretion, shall determine the priority as between those Partners. This Agreement does not obligate NASA to seek alternative government property or services under the jurisdiction of NASA at other locations.

ARTICLE 7. NON-EXCLUSIVITY

This Agreement is not exclusive; accordingly, NASA may enter into similar agreements for the same or similar purpose with other private or public entities.

ARTICLE 8. LIABILITY AND RISK OF LOSS

Damage to NASA Property

In the event U.S. Government property is damaged as a result of activities conducted under this Agreement, Partner shall be solely responsible for the repair and restoration of such property subject to NASA direction. NASA shall be responsible for such damage caused by the negligence or willful misconduct of its employees or related entities or caused by failure or incorrect operation of a WSTF system/facility

A. Partner hereby waives any claims against NASA, its employees, its related entities, (including, but not limited to, contractors and subcontractors at any tier, grantees, investigators, customers, users, and their contractors and subcontractors, at any tier) and employees of NASA's related entities for any injury to, or death of, Partner employees or the employees of Partner's related entities, or for damage to, or loss of, Partner's property or the property of its related entities arising from or related to activities conducted under this Agreement, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct.

B. Partner further agrees to extend this unilateral waiver to its related entities by requiring them, by contract or otherwise, to waive all claims against NASA, its related entities, and employees of NASA and employees of NASA's related entities for injury, death, damage, or loss arising from or related to activities conducted under this Agreement.

ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

Information and data exchanged under this Agreement is exchanged without restrictions unless required by national security regulations (e.g., classified information) or as otherwise provided in this Agreement or agreed to by the Parties for specifically identified information or data (e.g., information or data specifically marked with a restrictive notice).

ARTICLE 10. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS

A. "Related Entity" as used in this Invention and Patent Rights Article means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or Partner assigned, tasked, or contracted with to perform activities under this Agreement.

B. The invention and patent rights herein apply to employees and Related Entities of Partner. Partner shall ensure that its employees and Related Entity employees know about and are bound by the obligations under this Article.

C. NASA has determined that 51 U.S.C. § 20135(b) does not apply to this Agreement. Therefore, title to inventions made (conceived or first actually reduced to practice) under this Agreement remain with the respective inventing party(ies). No invention or patent rights are exchanged or granted under this Agreement. NASA and Partner will use reasonable efforts to report inventions made jointly by their employees (including employees of their Related Entities). The Parties will consult and agree on the responsibilities and actions to establish and maintain patent protection for joint invention, and on the terms and conditions of any license or other rights exchanged or granted between them.

ARTICLE 11. USE OF NASA NAME AND NASA EMBLEMS

A. NASA Name and Initials

Partner shall not use "National Aeronautics and Space Administration" or "NASA" in a way that creates the impression that a product or service has the authorization, support, sponsorship, or endorsement of NASA, which does not, in fact, exist. Except for releases under the "Release of General Information to the Public and Media" Article, Partner must submit any proposed public use of the NASA name or initials (including press releases and all promotional and advertising use) to the NASA Associate Administrator for the Office of Communications or designee ("NASA Communications") for review and approval. Approval by NASA Office of Communications shall be based on applicable law and policy governing the use of the NASA name and initials.

B. NASA Emblems

Use of NASA emblems (i.e., NASA Seal, NASA Insignia, NASA logotype, NASA Program Identifiers, and the NASA Flag) is governed by 14 C.F.R. Part 1221. Partner must submit any proposed use of the emblems to NASA Communications for review and approval.

ARTICLE 12. RELEASE OF GENERAL INFORMATION TO THE PUBLIC AND MEDIA

NASA or Partner may, consistent with Federal law and this Agreement, release general information regarding its own participation in this Agreement as desired.

Pursuant to Section 841(d) of the NASA Transition Authorization Act of 2017, Public Law 115-10 (the "NTAA"), NASA is obligated to publicly disclose copies of all agreements conducted pursuant to NASA's 51 U.S.C. §20113(e) authority in a searchable format on the NASA website within 60 days after the agreement is signed by the Parties.

The Parties acknowledge that a copy of this Agreement will be disclosed, without redactions, in accordance with the NTAA.

ARTICLE 13. DISCLAIMER OF WARRANTY

Goods, services, facilities, or equipment provided by NASA under this Agreement are provided "as is." NASA makes no express or implied warranty as to the condition of any such goods, services, facilities, or equipment, or as to the condition of any research or information generated under this Agreement, or as to any products made or developed under or as a result of this Agreement including as a result of the use of information generated hereunder, or as to the merchantability or fitness for a particular purpose of such research, information, or resulting product, or that the goods, services, facilities or equipment provided will accomplish the intended results or are safe for any purpose including the intended purpose, or that any of the above will not interfere with privately-owned rights of others. Neither the government nor its contractors shall be liable for special, consequential or incidental damages attributed to such equipment, facilities, technical information, or services provided under this Agreement or such research, information, or resulting products made or developed under or as a result of this Agreement.

ARTICLE 14. DISCLAIMER OF ENDORSEMENT

NASA does not endorse or sponsor any commercial product, service, or activity. NASA's participation in this Agreement or provision of goods, services, facilities or equipment under this Agreement does not constitute endorsement by NASA. Partner agrees that nothing in this Agreement will be construed to imply that NASA authorizes, supports, endorses, or sponsors any product or service of Partner resulting from activities conducted under this Agreement, regardless of the fact that such product or service may employ NASA-developed technology.

ARTICLE 15. COMPLIANCE WITH LAWS AND REGULATIONS

A. The Parties shall comply with all applicable laws and regulations including, but not limited to, safety; security; export control; environmental; and suspension and debarment laws and regulations. Access by a Partner to NASA facilities or property, or to a NASA Information Technology (IT) system or application, is contingent upon compliance with NASA security and safety policies and guidelines including, but not limited to, standards on badging, credentials, and facility and IT system/application access.

B. With respect to any export control requirements:

1. The Parties will comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 C.F.R. Parts 120 through 130, and the Export Administration Regulations (EAR), 15 C.F.R. Parts 730 through 799, in performing work under this Agreement or any Annex to this Agreement. In the absence of available license exemptions or exceptions, the Partner shall be responsible for

obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data and software, or for the provision of technical assistance.

2. The Partner shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of work under this Agreement or any Annex under this Agreement, including instances where the work is to be performed on-site at NASA and where the foreign person will have access to export-controlled technical data or software.

3. The Partner will be responsible for all regulatory record-keeping requirements associated with the use of licenses and license exemptions or exceptions.

4. The Partner will be responsible for ensuring that the provisions of this Article apply to its Related Entities.

C. With respect to suspension and debarment requirements:

1. The Partner hereby certifies, to the best of its knowledge and belief, that it has complied, and shall comply, with 2 C.F.R. Part 180, Subpart C, as supplemented by 2 C.F.R. Part 1880, Subpart C.

2. The Partner shall include language and requirements equivalent to those set forth in subparagraph C.1., above, in any lower-tier covered transaction entered into under this Agreement.

ARTICLE 16. TERM OF AGREEMENT

This Agreement becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of both Parties hereto, or one year from the Effective Date, whichever comes first.

ARTICLE 17. RIGHT TO TERMINATE

A. NASA's commitment under this Agreement to make available government property and services required by Partner may be terminated by NASA, in whole or in part, (a) upon a declaration of war by the Congress of the United States, or (b) upon a declaration of a national emergency by the President of the United States, or (c) upon Partner's failure to make payments as set forth in the "Financial Obligations" Article, or (d) upon Partner's failure to meet its obligations under the Agreement, or (e) upon a NASA determination, in writing, that NASA is required to terminate such services for reasons beyond its control. For purposes of this Article, reasons beyond NASA's control are reasons which make impractical or impossible NASA's or its contractors' or subcontractors' performance of this Agreement. Such reasons include, but are not limited to, acts of God or of the public enemy, acts of the U.S. Government other than NASA, in either its sovereign or contractual capacity (to include failure of Congress to appropriate

sufficient funding), fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather.

B. In the event of termination for reasons given above, NASA will seek to provide reasonable advance notice and will seek to mitigate the effect of such termination, if possible, and will enter into discussions with Partner for that purpose. For the use of property or services provided for on a fixed-price basis, the costs incurred by the United States, including termination costs, shall not exceed the fixed price of the services which would have been provided had termination not occurred. For use of property or services provided on a cost basis, partner will be liable for all costs, consistent with law and NASA policy, which are incurred by NASA in the provision of property or services, including termination costs associated with the Agreement activities.

C. NASA shall not be liable for any costs, loss of profits, revenue, or other direct, indirect, or consequential damages incurred by Partner, its contractors, subcontractors, or customers as a result of the termination by NASA pursuant to paragraph A of this Article.

D. Partner shall have the right to terminate, in whole or in part, this Agreement at any time. In the event of such termination, Partner will be obligated to reimburse NASA for all its costs which have been incurred in support of this Agreement up to the date the termination notice was received by NASA as well as those costs which are incurred as a result of such termination.

E. This Article is not intended to limit or govern the right of NASA or Partner, in accordance with law, to terminate its performance under this Agreement, in whole or in part, for Partner's or NASA's breach of a provision in this Agreement.

ARTICLE 18. CONTINUING OBLIGATIONS

The rights and obligations of the Parties that, by their nature, would continue beyond the expiration or termination of this Agreement, e.g., "Liability and Risk of Loss", "Intellectual Property Rights"-related clauses, and "Financial Obligations" shall survive such expiration or termination of this Agreement.

ARTICLE 19. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Agreement.

Management Points of Contact

NASA White Sands Test Facility

Robert M. Cort
Manager, NASA JSC White Sands Test Facility
Mail Stop: 100:112A
12600 NASA Road
Las Cruces, NM 88012
Phone: 575-524-5771
robert.m.cort@nasa.gov

THE BOEING COMPANY

Jeffrey C. Persh
Contracts Representative
Mail Suite: W-S50-X403
2060 E. Imperial Highway
El Segundo, CA 90245-3507
Phone: 310-416-2308
Jeffrey.c.persh@boeing.com

Technical Points of Contact

NASA White Sands Test Facility

Daniel Wofford
Project Manager
Mail Suite: 462PD
12600 NASA Road
Las Cruces, NM 88012
Phone: 575-524-5006
daniel.wofford-1@nasa.gov

THE BOEING COMPANY

Tim Price
Propulsion Engineer
Mail Suite: W-S25-D603
2060 E. Imperial Highway
El Segundo, CA 90245-3507
Phone: 657-237-0436
timothy.m.price@boeing.com

ARTICLE 20. DISPUTE RESOLUTION

Except as otherwise provided in the Article entitled "Priority of Use," the Article entitled "Intellectual Property Rights – Invention and Patent Rights" (for those activities governed by 37 C.F.R. Part 404), and those situations where a pre-existing statutory or regulatory system exists (e.g., under the Freedom of Information Act, 5 U.S.C. § 552), all disputes concerning questions of fact or law arising under this Agreement shall be referred by the claimant in writing to the appropriate person identified in this Agreement as the "Points of Contact." The persons identified as the "Points of Contact" for NASA and the Partner will consult and attempt to resolve all issues arising from the implementation of this Agreement. If they are unable to come to agreement on any issue, the dispute will be referred to the signatories to this Agreement, or their designees, for joint resolution. If the Parties remain unable to resolve the dispute, then the NASA signatory or that person's designee, as applicable, will issue a written decision that will be the final agency decision for the purpose of judicial review. Nothing in this Article limits or prevents either Party from pursuing any other right or remedy available by law upon the issuance of the final agency decision.

ARTICLE 21. INVESTIGATIONS OF MISHAPS AND CLOSE CALLS

In the case of a close call, mishap or mission failure, the Parties agree to provide assistance to each other in the conduct of any investigation. For all NASA mishaps or

close calls, Partner agrees to comply with NPR 8621.1, "NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping" and [insert Center safety policies, as appropriate].

ARTICLE 22. MODIFICATIONS

Any modification to this Agreement shall be executed, in writing, and signed by an authorized representative of NASA and the Partner.

ARTICLE 23. ASSIGNMENT

Neither this Agreement nor any interest arising under it will be assigned by the Partner or NASA without the express written consent of the officials executing, or successors, or higher- level officials possessing original or delegated authority to execute this Agreement.

ARTICLE 24. APPLICABLE LAW

U.S. Federal law governs this Agreement for all purposes, including, but not limited to, determining the validity of the Agreement, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

ARTICLE 25. INDEPENDENT RELATIONSHIP

This Agreement is not intended to constitute, create, give effect to or otherwise recognize a joint venture, partnership, or formal business organization, or agency agreement of any kind, and the rights and obligations of the Parties shall be only those expressly set forth herein.

ARTICLE 26. LOAN OF GOVERNMENT PROPERTY

The parties shall enter into a NASA Form 893, Loan of NASA Equipment, for NASA equipment loaned to Partner.

ARTICLE 27. SIGNATORY AUTHORITY

The signatories to this Agreement covenant and warrant that they have authority to execute this Agreement. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
WHITE SANDS TEST FACILITY

THE BOEING COMPANY

BY: _____
Robert Cort
Manager, White Sands Test Facility

BY: _____
Jeffrey C. Persh
Procurement Agent

DATE: _____

DATE: __04/27/2021_____